Half a Brain More

The basic model of brain function has been established for years: nerve cells (neurons) communicate across tiny gaps (synapses) and establish networks of connections that allow us to think, remember and jump for joy. That understanding could change dramatically if new findings about the role of glial cells—long considered to do little more than maintain a healthy environment for neurons—prove out.

The brain has even more glial cells than neurons. In the past several years, sensitive imaging tests have shown that glia communicate with neurons. And in November neuroscientist R. Douglas Fields and graduate student Beth Stevens of the National Institute of Child Health and Human Development presented evidence at a Society for Neuroscience meeting that glia also communicate among themselves, in a separate but parallel network to the brain's neural network. The glia use chemical messaging, mediated by calcium, whereas neurons use electrical messaging via neurotransmitters.

Fields and others are beginning to show that by communicating, glia regulate the formation of synapses and even which connections get stronger or weaker over time—the essence of learning and storing long-term memories. If this role can be confirmed, it would mean that glial cells greatly influence how well the human brain performs. Experts are cautious about assigning new prominence to glia too quickly, yet they are excited. "Cellular neuroscientists are beginning to feel as though half the brain has gone largely unexplored," Fields says.

—Mark Fischetti

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